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WHAT IS CLAIMED IS:

1. A fuel injector for a gas turbine comprising:

a nozzle body having a discharge portion defining a discharge orifice, the
5 discharge portion including a fuel circuit for directing a hollow fuel film toward the
discharge orifice from a fuel pump associated with the gas turbine, and an air assist circuit
for directing pressurized air from a source external to the gas turbine toward the fuel film
upstream from the discharge orifice to impinge on an inner surface of the fuel film issuing
from the discharge orifice.

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2. A fuel injector as recited in Claim 1, wherein the gas turbine is a land based
engine and the air assist circuit of the discharge portion is supplied by an external
compressor.

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3. A fuel injector as recited in Claim 1, wherein the gas turbine is a propulsion
engine and the air assist circuit of the discharge portion is supplied by an external storage
tank.

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4. A fuel injector as recited in Claim 3, wherein the external storage tank is
charged by the gas turbine during high pressure operating cycles.

5. A fuel injector as recited in Claim 1, wherein the discharge portion includes a first air blast circuit for directing engine compressor discharge air toward the fuel film upstream from the discharge orifice to impinge on an inner surface of the fuel film issuing from the discharge orifice, and a second air blast circuit for directing engine compressor discharge air toward the fuel film downstream from the discharge orifice to impinge on an outer surface of the fuel film issuing from the discharge orifice.

6. A fuel injector as recited in Claim 1, wherein the nozzle body includes a fuel inlet for admitting fuel into the fuel circuit.

7. A fuel injector as recited in Claim 1, wherein the nozzle body includes an air assist inlet for admitting air into the air assist circuit.

8. A fuel injector as recited in Claim 5, wherein the nozzle body includes a first air inlet for admitting air into the first air blast circuit and a second air inlet for admitting air into the second air blast circuit.

9. A fuel injector as recited in Claim 1, wherein the nozzle body is configured as at least one of an airblast atomizer and a simplex airblast atomizer.

10. A fuel injector as recited in Claim 1, wherein the nozzle body is configured as a pressure atomizer.

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11. A fuel injector for a gas turbine comprising:

a) an inlet portion including a fuel inlet for receiving fuel from a fuel pump associated with the gas turbine, and an air assist inlet for receiving pressurized air from a source external to the gas turbine; and

5 b) a discharge portion defining a discharge orifice, the discharge portion including a fuel circuit for directing a hollow fuel film toward the discharge orifice from the fuel inlet, and an air assist circuit for directing pressurized air from the air assist inlet toward the fuel film upstream from the discharge orifice to impinge on an inner surface of the fuel film issuing from the discharge orifice.

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12. A fuel injector as recited in Claim 11, wherein the gas turbine is a land based engine and the air assist circuit of the discharge portion is supplied by an external compressor.

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13. A fuel injector as recited in Claim 11, wherein the gas turbine is a propulsion engine and the air assist circuit of the discharge portion is supplied by an external storage tank.

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14. A fuel injector as recited in Claim 13, wherein the external storage tank is charged by the gas turbine during high pressure operating cycles.

15. A fuel injector as recited in Claim 11, wherein the discharge portion includes a first air blast circuit for directing engine compressor discharge air toward the fuel film upstream from the discharge orifice to impinge on an inner surface of the fuel film issuing from the discharge orifice, and a second air blast circuit for directing engine compressor discharge air toward the fuel film downstream from the discharge orifice to impinge on an outer surface of the fuel film issuing from the discharge orifice.

16. A fuel injector as recited in Claim 15, further comprising a nozzle body extending between the inlet portion and the discharge portion, wherein the nozzle body includes a first air inlet for admitting engine compressor discharge air into the first air blast circuit and the discharge portion includes a second air inlet for admitting engine compressor discharge air into the second air blast circuit.

17. A method of fuel atomization in a fuel injector of a gas turbine comprising the steps of:

- a) providing a nozzle having a discharge portion defining a discharge orifice;
- b) directing a hollow fuel film toward the discharge orifice from a fuel pump associated with the gas turbine; and
- c) directing pressurized air toward the fuel film upstream from the discharge orifice from a source external to the gas turbine to impinge on an inside surface of the fuel film issuing from the discharge orifice.

18. A method of fuel atomization according to Claim 17, further comprising the step of directing engine compressor discharge air toward the fuel film downstream from the discharge orifice to impinge on an outside surface of the fuel film issuing from the discharge orifice.

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19. A method of fuel atomization according to Claim 17, further comprising the step of directing engine compressor discharge air toward the fuel film upstream from the discharge orifice to impinge on an inside surface of the fuel film issuing from the discharge orifice.

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20. A method of fuel atomization according to Claim 17, wherein the step of directing pressurized air toward the discharge orifice from a source external to the gas turbine occurs during engine ignition.

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21. An airblast atomization nozzle for a gas turbine comprising:

- a) an outer air cap having an interior chamber;
- b) an air swirler disposed within the interior chamber of the air cap and

having an axial bore extending therethrough, the air cap and the air swirler defining an outer airblast circuit therebetween;

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- c) a prefilmer disposed within the axial bore of the air swirler and having an axial bore extending therethrough;

- d) a fuel swirler disposed within the axial bore of the prefilmer and having an axial bore extending therethrough, the prefilmer and the fuel swirler defining a fuel circuit therebetween; and

e) a heat shield disposed within the axial bore of the fuel swirler and having an axial bore extending therethrough defining an inner airblast circuit, the heat shield and the fuel swirler defining an air assist circuit therebetween.

5 22. An airblast atomization nozzle as recited in Claim 21, further comprising a nozzle body including means for delivering fuel to the fuel circuit from a fuel pump associated with the gas turbine, and means for delivering high pressure, high velocity air to the air assist circuit from a supply source external to the gas turbine.

10 23. A pressure atomization nozzle for a gas turbine comprising:
a) an outer cone having an axial bore extending therethrough;
b) a fuel swirler disposed within the axial bore of the cone and having an axial bore extending therethrough, the cone and the fuel swirler defining a fuel circuit therebetween for receiving low pressure fuel from a fuel pump associated with the gas
15 turbine; and

c) an air swirler disposed within the axial bore of the fuel swirler, the air swirler and the fuel swirler defining an air assist circuit therebetween for receiving high pressure, high velocity air from a supply source external to the gas turbine.

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